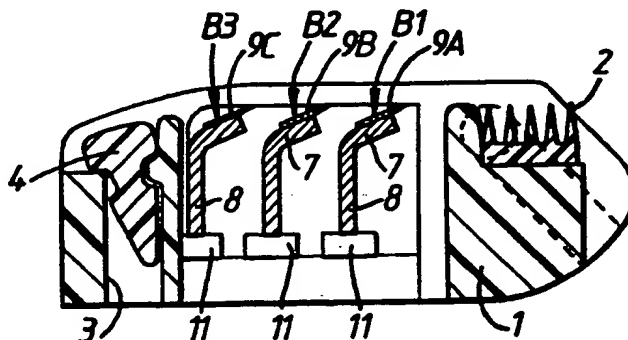




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<p>(21) International Application Number: <b>PCT/GB92/00539</b></p> <p>(22) International Filing Date: <b>24 March 1992 (24.03.92)</b></p> <p>(30) Priority data: <b>9106860.1</b>      <b>2 April 1991 (02.04.91)</b>      <b>GB</b></p> <p>(71) Applicant (for all designated States except US): <b>THE GILLETTE COMPANY [US/US]; Prudential Tower Building, Boston, MA 02199 (US).</b></p> <p>(72) Inventors; and (75) Inventors/Applicants (for US only) : <b>GILDER, Bernard [GB/GB]; 51 Lincoln Gardens, Twyford, Berkshire RG10 9HU (GB). BULLEN, Henry, Eric [GB/GB]; 7 Hillview Close, Tilehurst, Reading RG3 6YX (GB).</b></p>	<p>(74) Agent: <b>LERWILL, John; A.A. Thornton &amp; Co., Northumberland House, 303-306 High Holborn, London WC1V 7LE (GB).</b></p> <p>(81) Designated States: <b>AT, AT (European patent), AU, BB, BE (European patent), BF (OAPI patent), BG, BJ (OAPI patent), BR, CA, CF (OAPI patent), CG (OAPI patent), CH, CH (European patent), CI (OAPI patent), CM (OAPI patent), CS, DE, DE (European patent), DK, DK (European patent), ES, ES (European patent), FI, FR (European patent), GA (OAPI patent), GB, GB (European patent), GN (OAPI patent), GR (European patent), HU, IT (European patent), JP, KP, KR, LK, LU, LU (European patent), MC (European patent), MG, ML (OAPI patent), MN, MR (OAPI patent), MW, NL, NL (European patent), NO, PL, RO, RU, SD, SE, SE (European patent), SN (OAPI patent), TD (OAPI patent), TG (OAPI patent), US.</b></p> <p><b>Published</b> <i>With international search report.</i></p>	

(54) Title: SAFETY RAZORS



## (57) Abstract

A tandem blade razor has two conventionally sharpened blade members (9A and B or 9C) and a third skin engaging member (9C or 9B) of planar form, having a skin engaging edge with a tip radius of at least 0.5 microns. This rounded edge is positioned between the sharpened blade edges or behind them.

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Safety Razors

This invention relates to safety razors for use in wet shaving, that is razors comprising one or more razor blades mounted in a head or frame including a guard member which limits the danger of the blade (or blades) deeply penetrating the skin of the user.

For many years, all razors which were marketed on a commercial scale incorporated a single blade, mostly of the "double-edged" type of which the edges could be used alternately. The early 1970's saw the introduction of blade cartridges comprising a pair of blade members having spaced, parallel cutting edges parallel with each other, so that they act in tandem upon the skin of the user. These "tandem blade cartridges" are now consumed in very large quantities in many countries.

It had long been predicted that the provision of a number of parallel blade edges would tend to increase the closeness and/or comfort in use of safety razors and this expectation has been fulfilled by the better quality tandem blade cartridges marketed in recent years.

It might accordingly be expected that a further improvement could be obtained by adding a third blade and trials conducted by the present Applicants have shown this to be the case.

However, the present invention is based on the

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surprising discovery that the results are even more satisfactory if the skin engaging edge of either the second or third member of a group of three tandem blades is rounded to such an extent that it will not penetrate facial hairs or scrape the skin. On the other hand, the edge should have a very narrow area of contact with the skin, so that the pressure which it applies is similar to that applied by the sharpened edges of the true blade members.

Most conveniently, the third member is substantially identical with the two blade members, being of the same general form and made of blade steel, but its skin engaging edge is formed with a relatively large radius. This edge is, however, electro-polished to give it a very smooth surface. The tip radius is preferably between 0.5 and 30 microns.

It would alternatively be possible to provide a third "blunted" member of quite a different form from the blade members and of another material, such as a relatively rigid plastics material.

Two forms of safety razor cartridge in accordance with the invention will now be described, by way of example, with reference to the accompanying drawings, in which:-

Fig. 1 is a perspective view of a first form of cartridge;

Fig. 2 is a cross-section taken at the line II-II in Fig. 1;

Fig. 3 is scrap cross-section taken in the line III-III in Fig. 1; and

Fig. 4 is a cross-section, corresponding to Fig. 2, of a second form of razor cartridge.

The cartridge shown in Figs. 1 to 3 comprises a

generally rectangular open frame 1 of moulded plastics, shaped to define a shoulder to receive and support a separately formed guard member 2 and a slot 3 to receive a separately formed cap member 4, preferably made of a lubricating strip.

Three substantially identical units B1, B2 and B3 are mounted in the frame 1, each comprising a metal support of inverted L-shape having an upwardly and forwardly directed limb constituting a blade platform 7 and a vertical support leg 8. The platform 7 has directly attached to it a respective member 9A, 9B, 9C of stainless steel razor blade strip. The three units are mounted for movement independently of each other in the planes of their legs 8 and are supported on respective spring fingers 11.

The member 9A of unit B1 and that of either B2 or B3 are conventionally sharpened at their forward, leading edges to form two blade members, but the third member (9C or 9B) (at either B3 or B2, respectively) is formed with a relatively blunt edge having an ultimate tip radius of at least 0.5 micron, so that it is not quite sharp enough to penetrate facial hairs, nor to scrape the skin. It is, however, electro-polished to have a very smooth surface finish. The third member could have a larger radius, up to about 50 microns but preferably no more than about 30 microns.

The third member may be incorporated in blade unit B2 or B3, but not in the leading blade unit B1.

The second form of cartridge, illustrated in Fig. 4, has a moulded frame 101 of more conventional form, comprising a first, lower moulding 101A having secured to it by integral rivets 112 a second, upper moulding 101B which supports a cap member 104, preferably formed of lubricating strip. The lower moulding 101A provides a guard member 102. Securely and fixedly clamped between the mouldings 101A and 101B is an

assembly of three members 109A, 109B, 109C and two spacers 113, 114.

Once again, the leading member (109A) and one of the others are conventionally sharpened, whilst the third (109B or 109C) has a relatively blunt edge, rounded to a radius of between 0.5 and 30 microns.

This second form of razor cartridge has been subjected to trials which have shown that, compared with a control cartridge having three conventional sharpened edges, significant improvements in comfort with no loss in closeness were obtained by use of the slightly blunted member in the second or third positions, i.e. at 109B or 109C. However, when the blunted member is placed in the leading position, at 109A, the closeness was significantly reduced.

It will be noted that in both embodiments described above, the three skin engaging edges are equally spaced from each other. They are all formed of blade steel and correspondingly shaped, except for the slight rounding of one member. This is convenient from a manufacturing viewpoint but it would also be possible to form the third member quite differently, say as a moulded member of relatively rigid plastics material.

Many other variations and modifications will, of course, be possible within the scope of the present invention.

CLAIMS:-

1. A safety razor comprising a pair of tandem blade members having their sharpened cutting edges parallel with each other, characterised by the provision of a third skin engaging member (9B, 9C; 109B, 109C) of planar form and having a skin engaging edge parallel with the edges of the blade members, the said skin engaging edge having a tip radius of 0.5 to 50 microns and in that the said third skin engaging member (B2 or B3) is positioned rearwardly of the leading blade member (B1).
2. A safety razor according to claim 1, characterised in that the said tip radius is between 0.5 and 30 microns.
3. A safety razor according to claim 1 or 2, characterised in that the said third member has the same form as the said blade members.
4. A safety razor according to claim 1, 2 or 3, characterised in that the said third member is made of metal.
5. A safety razor according to claim 4, characterised in that the said third skin engaging member (9B or 9C; 109B or 109C) is made of blade steel and has its skin engaging edge electro-polished.
6. A safety razor according to claim 1, 2 or 3, characterised in that the said third skin engaging member (9B, 9C; 109B, 109C) is formed as a plastics moulding.
7. A safety razor according to any preceding claim, characterised in that the spacing between the skin engaging edges of the first and second members (9A, 9B; 109A, 109B) is substantially equal to that between the second and third members (9A, 9B; 109B, 109C).

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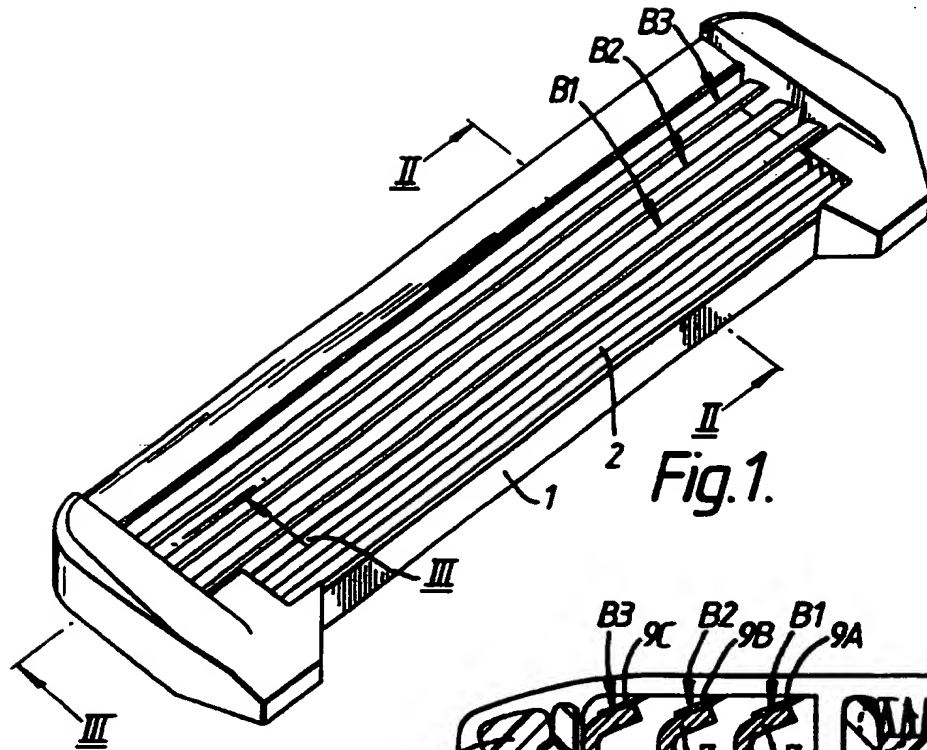


Fig. 1.

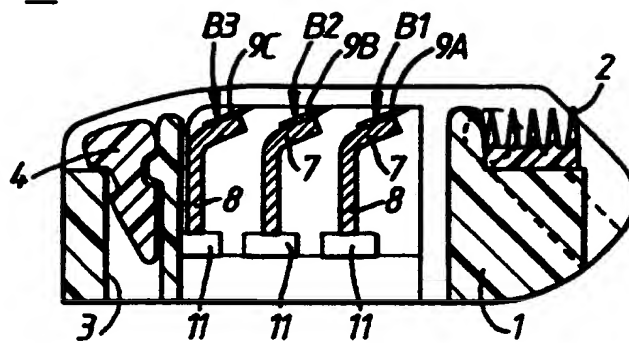


Fig. 2.

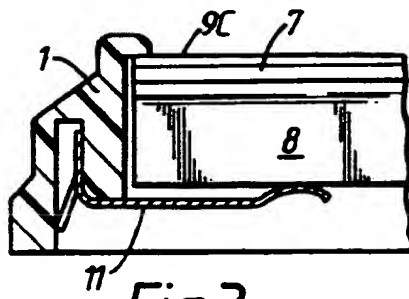


Fig. 3.

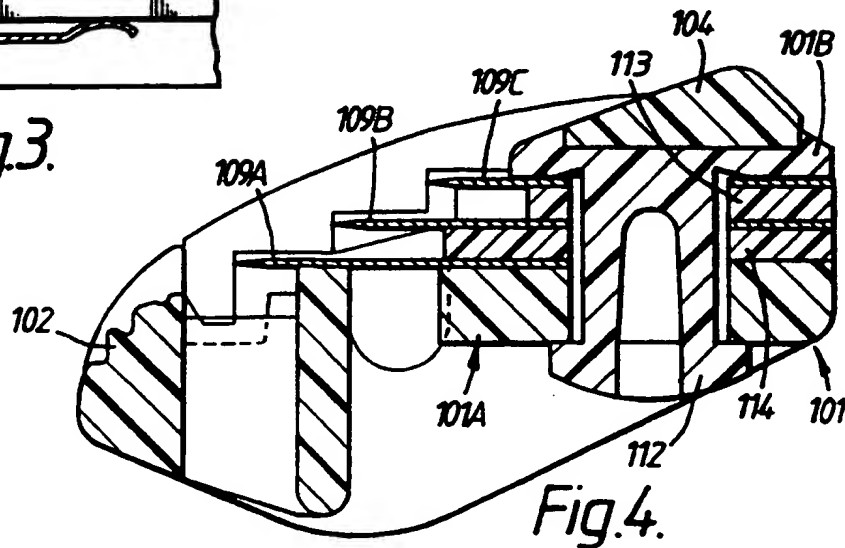


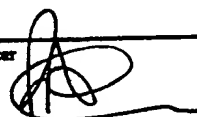
Fig. 4.



## INTERNATIONAL SEARCH REPORT

PCT/GB 92/00539

International Application No

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) <sup>6</sup>		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int.Cl. 5 B26B21/22; B26B21/54		
II. FIELDS SEARCHED		
Minimum Documentation Searched <sup>7</sup>		
Classification System	Classification Symbols	
Int.Cl. 5	B26B	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched <sup>8</sup>		
III. DOCUMENTS CONSIDERED TO BE RELEVANT <sup>9</sup>		
Category <sup>10</sup>	Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup>	Relevant to Claim No. <sup>13</sup>
A	DE,A,2 750 796 (WILKINSON SWORD LTD.) 18 May 1978 see page 5, last paragraph - page 7, paragraph 1; figures	1,3-5,7
A	GB,A,714 122 (H. HULVERSCHEIDT) 25 August 1954 see page 2, line 16 - line 59; figures	1,3-5,7
A	FR,A,2 367 580 (WARNER-LAMBERT CO.) 12 May 1978 see page 7, paragraph 2 - page 8, paragraph 2; figures 4,5	1,6
A	EP,A,0 336 355 (M. ELTIS) 11 October 1989 see column 1, line 43 - column 3, line 31; figures	1,3-6
A	US,A,4 272 885 (F. A. FERRARO) 16 June 1981 see column 2, line 32 - column 3, line 14; figures 1-3	1,4,6
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IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
23 JUNE 1992	8. 07. 92	
International Searching Authority	Signature of Authorized Officer	
EUROPEAN PATENT OFFICE	RAVEN P. 	

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**ANNEX TO THE INTERNATIONAL SEARCH REPORT  
ON INTERNATIONAL PATENT APPLICATION NO. GB 9200539  
SA 57742**

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on  
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